Can RTP Deliver the Demand Response that California Needs?

A Case Study of Niagara Mohawk's RTP Tariff

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Outline

- Project and tariff background
- Customer Satisfaction and Choices
- Does RTP deliver demand response?
- How do RTP and DR programs interact?
- Do enabling technologies help?
- Summary and Policy Implications

RTP as Default Service: Status

State (Utility)	Large C/I Default Service (Customer Size)	Number of Customers	Peak Demand (MW)
Niagara Mohawk Power Co	Day-ahead Hourly Prices (>2 MW)	~140	550
Maryland (BG&E)	Real-time Hourly Prices (>600 kW)	620	1540
New Jersey	Real-time Hourly Prices (>1.4 MW)	1696	2580
PA (Duquesne Light & Power)	Real-time Hourly Prices (> 300 kW)	~1000	~1500
Illinois (ComEd)	Day-Ahead Hourly Prices (>3 MW, Dec. 2006)	?	?
Ohio	Market-Based Variable Rate	All "large general service" customers	
Georgia Power	Day-ahead & Hour Ahead Hourly Prices (Optional, >250 kW)	1600	5000

NMPC Market Situation

- RTP is the default tariff for the "SC-3A" class (large C/I customers >2MW) since late 1998
- Unbundled charges for T&D, CTC, etc.
- Customer Choices for Electric Commodity Service
  - NMPC Option 1: RTP indexed to NYISO DAM – default option
  - NMPC Option 2: fixed rate contract – one-time availability at program inception (now expired)
  - Competitive retail supplier (ESCO)
- Several ISO-based DR programs
  - Emergency Demand Response Program (EDRP): pay-for performance
  - Installed Capacity (ICAP): reservation payment
  - Day-Ahead Demand Response Program

Importance of the Results

- Most comprehensive study of RTP response available
  - Elasticity estimates by business sector
  - Characterizes key drivers to participation, price response
  - Differentiates between load shifting and reducing discretionary consumption behaviors
- Transferability to CA context
  - Comparable customer mix and diversity
    - ~30% industrial, ~70% institutional/commercial
    - includes manufacturing plants, hospitals, universities, schools, office buildings, state facilities, wastewater treatment plants
  - Similar demand response situation
    - Utilities considering retail RTP and DR programs
    - Possibility of ISO-based DR programs

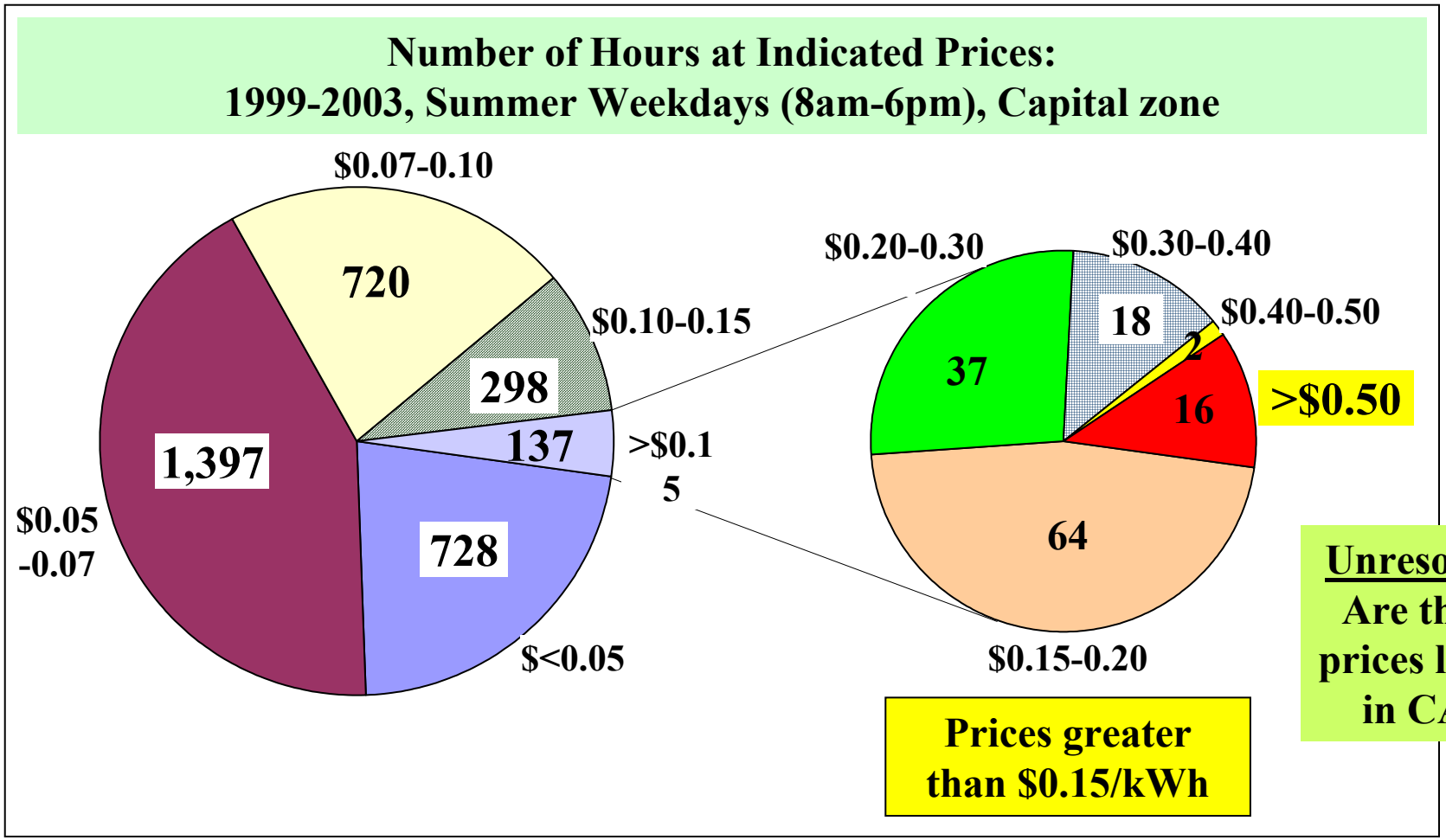
Survey Respondent and Population Characterization

Customer Characteristics		**Survey Respondents** (53 customers; 60 accounts)	**All SC-3A Customers** (130 customers; 149 accounts)
Business Type	Industrial	40%	32%
	Commercial	21%	23%
	Government/ educational	40%	46%
Average monthly maximum demand		3.0 MW	3.4 MW
Option 2		9%	18%

The survey response rate was about 40%.

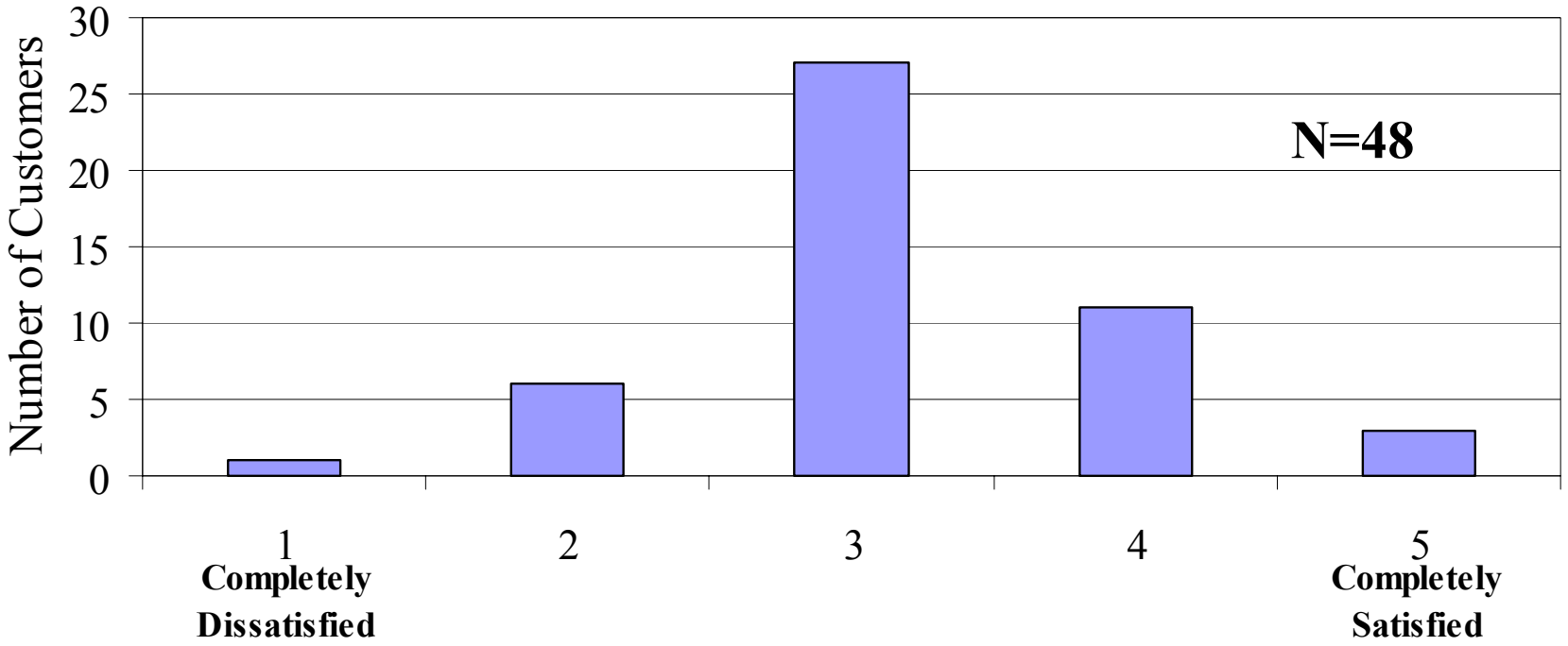
Industrials are over-represented in the survey sample; institutional customers are under-represented.

Customers Have Seen Occasional High Prices



- 137 hours over 4 summers with prices above $0.15/kWh
- Prices exceeded $0.50/kWh for 16 hours

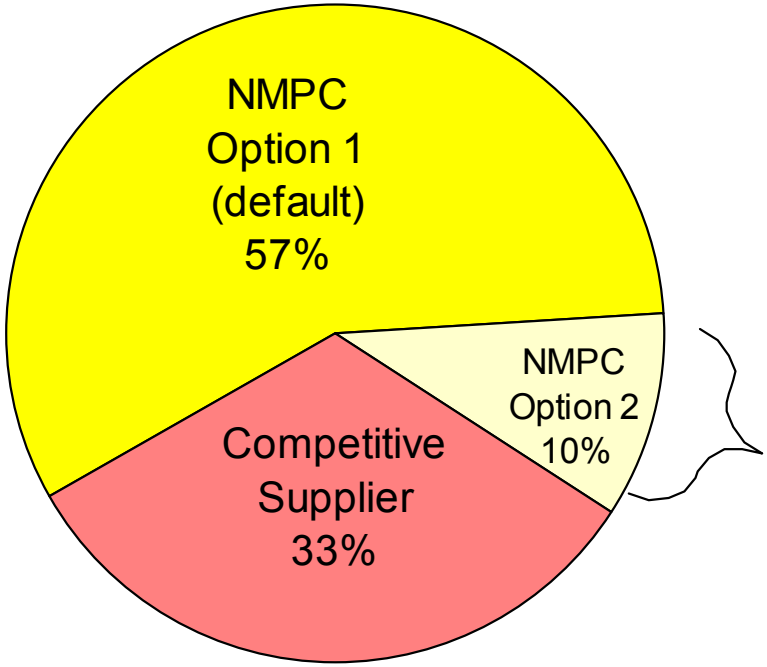
Survey Respondents' Satisfaction



Customer Satisfaction with 1998 Redesign of SC-3A

- Customers are relatively satisfied with the tariff
- Interviews reveal greater disappointment with limited offerings by competitive retailers

Supply Choices of SC-3A Population
(December 2002)



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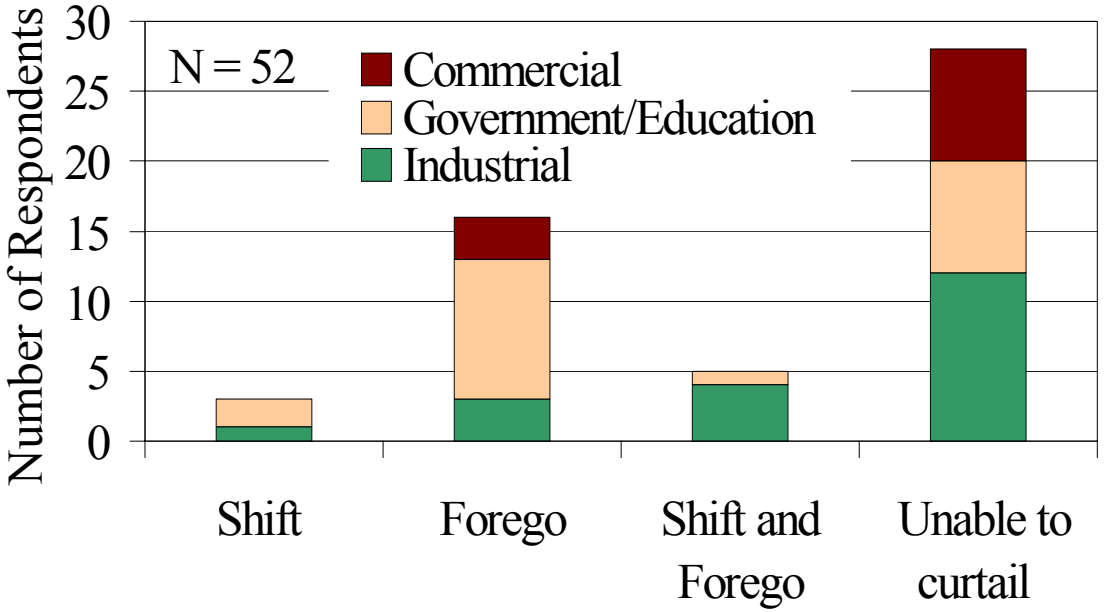
Residual Power:
- 29% NMPC Option 1
- 71% Competitive Supplier

Late 2004 Update:

- **over 60% have now switched to competitive suppliers**
- **may be driven by sunset of Option 2 hedge**

- 53% of SC-3A customers indicated that they had taken competitive supply at some time since 1998
- But does switching mean hedged?

Price Response: What Customers Told Us

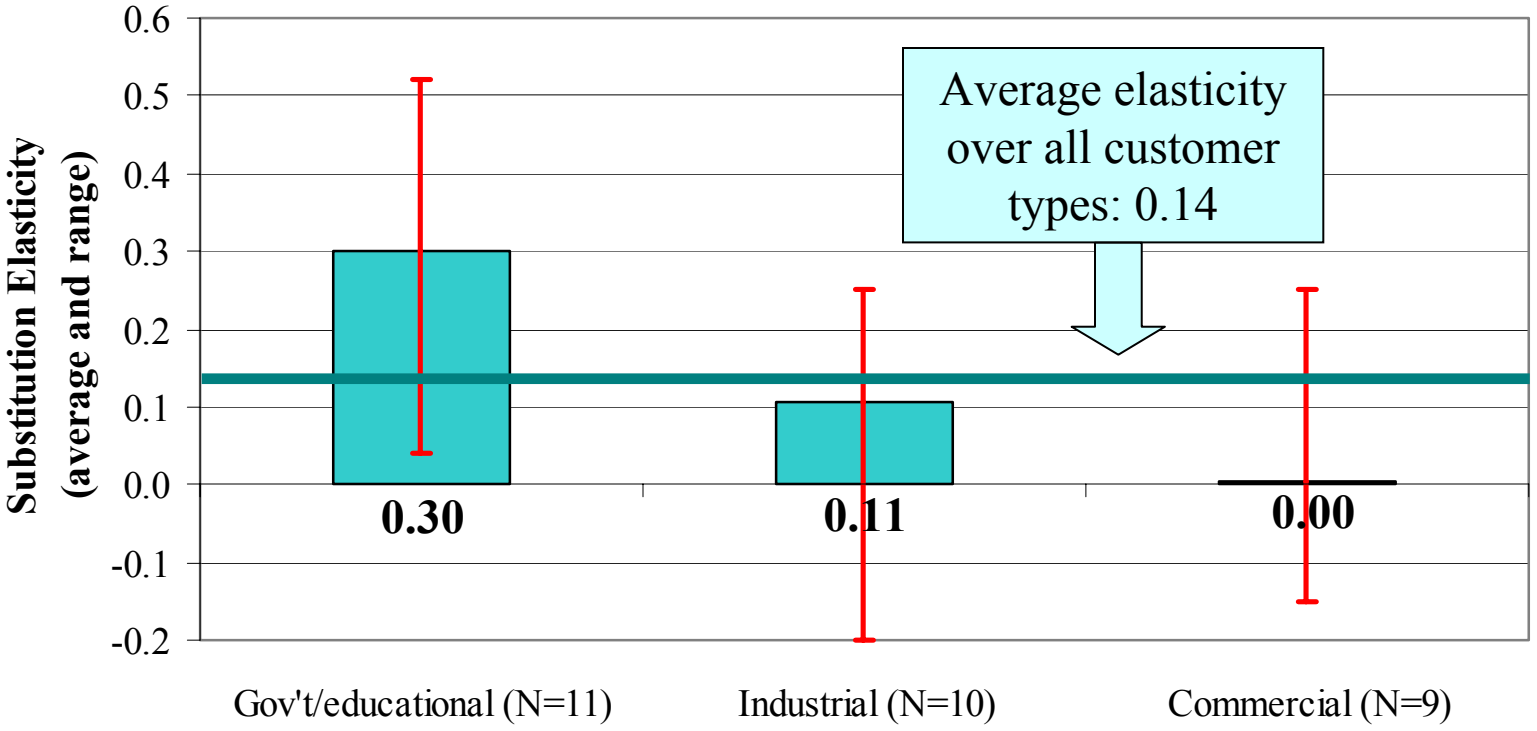


Unresolved

Do customers make a distinction between RTP price response and responding to ISO-declared curtailment events?

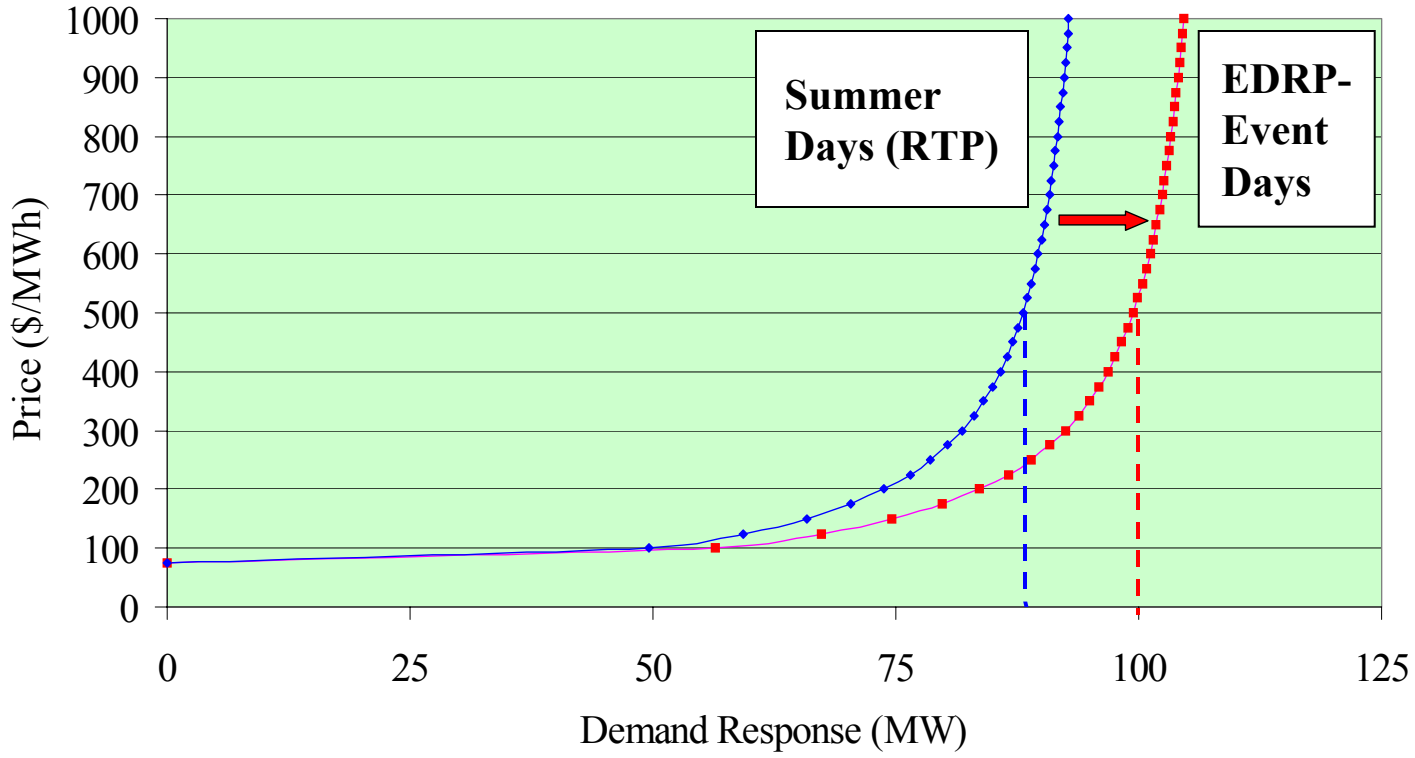
- 31% say they FOREGO usage (mainly govt/education customers)
- ~15% say they can SHIFT from on-peak to off-peak
- 54% of survey respondents claim they CANNOT CURTAIL
  - but 30% of them were enrolled in NYISO DR programs
- Customers may make a distinction:
  - RTP is price response
  - ISO programs are a call to keep the lights on (civic duty)

Price Response: Estimated Substitution Elasticities



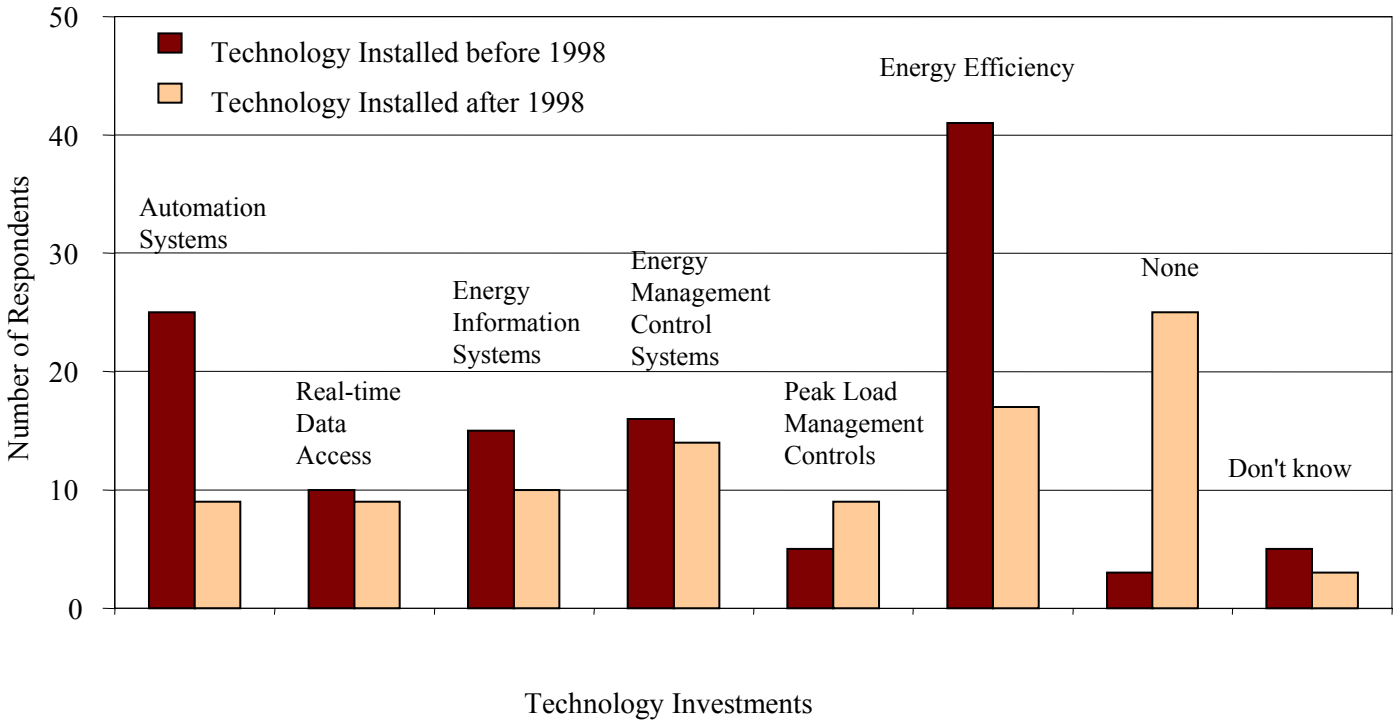
- Large range in average customer elasticities:
  - Gov't/educational customers are most price responsive
  - Industrial sector response is moderate
  - Commercial sector is unresponsive

Estimated Aggregate Demand Response: RTP and EDRP



- DR potential of SC-3A customers is ~100MW – about 18% of their total maximum demand
- SC-3A customers in NYISO Emergency DR program, mainly industrials, provide ~15MW of load curtailment

Customer Survey: Technology Adoption



- Technology adoption prior to 1998 was heavily efficiency oriented – reflecting aggressive NMPC DSM expenditures
- 45% of customers have invested since 1998 – emphasis toward load management-oriented devices – reflecting NYSERDA program incentives
- Customers are not fully aware of response strategies, even when they have equipment

Key Findings

- Customers are generally satisfied with default day-ahead RTP
  - Despite views expressed by some that hedging options are expensive relative to perceived risks
  - ~45% of customers remained on default RTP; many others fully or partially exposed to day-ahead prices
- Price response is modest overall
  - Government/educational customers are most responsive
  - Average elasticity (0.15) comparable to other studies' results
  - Aggregate DR potential is ~100MW at high prices
  - Most response involves reducing discretionary loads – technology has a limited impact
- ISO DR programs complement RTP
  - Industrial customer response to DR programs is greater than for RTP

Implications for California

- Results challenge conventional wisdom about which customers are most likely to respond
  - Institutional customers can provide significant price response
  - Some customers respond to *day-ahead* hourly prices
- RTP is best implemented as part of a portfolio of options
  - Emergency DR programs can complement RTP
  - Ensure adequate hedging options exist, at least initially
- Targeted customer education and technical assistance are needed to realize customers' inherent price response potential
  - Many customers are not aware of available price response technologies and strategies
  - Even more important if RTP is extended to smaller customers

Implications for California (cont'd)

- It will take time to develop RTP price response
  - Initial response for most customers is discretionary (not shifting), which limits:
    - The number of customers willing to participate
    - The amount of peak demand participants will curtail
  - How many customers already have the capability to shift load? At what price?
- Probably quicker to build DR capability with utility or ISO DR programs
  - Limited, voluntary exposure is a big plus to many customers
  - Easier to sell because of public duty aspect of ISO-declared events